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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,683	02/04/2004	Michael H.E. Ware	01-795	5117
27431	7590	06/15/2006	EXAMINER	
SHIMOKAJI & ASSOCIATES, P.C. 8911 RESEARCH DRIVE IRVINE, CA 92618			VAN, LUAN V	
			ART UNIT	PAPER NUMBER
			1753	

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/772,683	WARE ET AL.	
	Examiner Luan V. Van	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on May 12, 2006.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 13, 15-18, 23-28, 31, 32, 34-38 and 40-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 13, 15-18, 23-28, 31, 32, 34-38, and 40-44 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____ .  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____ .                                  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 12, 2006 has been entered.

### ***Response to Amendment***

Applicant's amendment of April 25, 2006 does not render the application allowable.

The amendment is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Claims 13, 15-18, 23-28, 31-32, 34-38, and 40-44 are amended to recite the limitation of "a thickness of at least about 0.002 inch". However, there is no evidence in the applicant's disclosure to support this limitation. The specification simply discloses that the coating meets the engineering requirements of aircraft wear coatings; this does not support the limitation of "a thickness of at least about 0.002 inch". The disclosure, therefore, does not provide a

clear indication to support the amended limitations. Applicant is required to cancel the new matter in the reply to this Office Action.

***Status of Objections and Rejections***

The objection to the claims has been withdrawn in view of Applicant's amendment.

The rejection of claims 1-12, 14, 19-22, 29-30, 33 and 39 is obviated by Applicant's cancellation.

All rejections from the previous office action using Lichtenberger et al. and Brar et al. as secondary references are withdrawn in view of applicant's amendments.

All other rejections from the previous office action are maintained.

New grounds of rejection under 35 U.S.C. 103(a) are necessitated by the amendments.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 13, 15-18, 23-28, 31-32, 34-38, and 40-44 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a

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way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 13, 15-18, 23-28, 31-32, 34-38, and 40-44 are amended to recite the limitation of "a thickness of at least about 0.002 inch". However, there is no evidence in the applicant's disclosure to support this limitation. The specification simply discloses that the coating meets the engineering requirements of aircraft wear coatings; this does not support the limitation of "a thickness of at least about 0.002 inch". The disclosure, therefore, does not provide a clear indication to support the amended limitations.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 13, 15, 16, 23-28, 31, 35-38, 40-42 and 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al.

Regarding claim 13, Brenner et al. teach a plating bath, comprising: a cobalt-phosphorous plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35); cobalt metal ions (figure 9) contained within said plating solution, chloride ions (figure 9) contained within said plating solution, phosphorous ions (figure 9) contained within said plating solution as phosphorous acid having a concentration of 0-160 g/L or about 0-21.3 oz/gal (figure 2 and 4) which is within the range of the instant claim, an oxidizing agent (or boric acid, column 3 lines 21-25) contained within said plating solution, and a hardening agent (or phosphorous acid, figure 9) contained within said plating solution. The elements are present in the solution as ions, since they are soluble. The coating of Brenner et al. is inherently a wear resistant coating, since it has a high Vickers hardness (column 5 line 73 -- column 6 line 70). With respect to the thickness of the coating, such limitation is not given patentability weight since the instant claim is directed to a solution.

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach a solution comprising of sodium chloride; or perborate as the source of boron.

Beebe, Jr. et al. teach method of plating a cobalt-phosphorous layer with the characteristics of "long fatigue life and high load carrying capacity in addition to ... good corrosion resistance" (column 1 lines 23-28) for the fabrication of bearings and the like.

In addition, Beebe, Jr. et al. teach that a typical cobalt-phosphorus plating solution comprises cobalt sulfate, sodium chloride (with a concentration of 17 g/L or about 2.3 oz/gal, which is within the range of the instant claim) and boric acids; and that a similar plating of cobalt- phosphorous can be suitably achieved by employing a solution comprising of cobalt chloride and sodium hypophosphite (column 4 lines 16-45).

Sturgill et al. teach using perborate (paragraph 53) as suitable oxidizers, and that "Oxidizers serve two important functions within the coating: 1) they act in cooperation with the stabilizer to impede the flow of ionic species through the coating, therefore minimizing charge transport, and 2) if a scratch is formed in the coating, these oxidizing species act to repair the breach by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier. The effectiveness of the oxidizing species is a function of its individual oxidation-reduction potential, with more highly oxidized species exhibiting greater corrosion protection" (paragraph 51).

Addressing claim 13, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al. by using the sodium chloride of Beebe, Jr. et al., because sodium chloride would yield an electroplated cobalt-phosphorous coating having high tensile strength and good corrosion resistance properties. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the solution of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraph 51).

Regarding claims 23-24, Brenner et al. teach phosphorous acid (figures 2 and 9).

Regarding claim 25, the difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach using sodium phosphite or hypophosphite, although Brenner et al. teach that phosphites are the most satisfactory source of phosphorous (column 2 lines 23-29). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al. by using a solution comprising of sodium phosphite or hypophosphite as taught by Beebe, Jr. et al., because sodium phosphite or hypophosphite are suitable sources of phosphorous and are suitable for forming cobalt-phosphorous alloys.

Regarding claim 15, Brenner et al. teach the cobalt metal content of said plating solution is about 39 g/L (computed from the 180 g/L of cobalt chloride in figure 9), or about 5.2 oz/gal, which is within the range of the instant claim.

Regarding claim 16, Brenner et al. teach a phosphorous-cobalt alloy plating solution comprising of cobalt chloride as a cobalt salt.

Regarding claims 26 and 27, Brenner et al. teach a phosphorous-cobalt alloy plating solution comprising of phosphoric acid (figure 9).

Regarding claim 28, Brenner et al. teach a plating bath, comprising: cobalt chloride (figure 9) contained within said plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35), boric acid (column 3 lines 21-25) contained within said plating solution, phosphoric acid, and phosphorous acid having a concentration of up to 160 g/L or about 21.3 oz/gal (figure 4) contained within said plating solution. The

coating of Brenner et al. is inherently a wear resistant coating, since it has a high Vickers hardness (column 5 line 73 -- column 6 line 70). With respect to the thickness of the coating, such limitation is not given patentability weight since the instant claim is directed to a solution.

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach a solution comprising of cobalt sulfate and sodium chloride or their concentration; or perborate as the source of boron or its concentration.

Beebe, Jr. et al. teach method of plating a cobalt-phosphorous layer with the characteristics of "long fatigue life and high load carrying capacity in addition to ... good corrosion resistance" (column 1 lines 23-28) for the fabrication of bearings and the like. In addition, Beebe, Jr. et al. teach that a typical cobalt-phosphorus plating solution comprises cobalt sulfate, sodium chloride (with a concentration of 17 g/L or about 2.3 oz/gal, which is within the range of the instant claim) and boric acids; and that a similar plating of cobalt- phosphorous can be suitably achieved by employing a solution comprising of cobalt chloride and sodium hypophosphite (column 4 lines 16-45).

Sturgill et al. teach using perborate (paragraph 53) as suitable oxidizers, and that "Oxidizers serve two important functions within the coating: 1) they act in cooperation with the stabilizer to impede the flow of ionic species through the coating, therefore minimizing charge transport, and 2) if a scratch is formed in the coating, these oxidizing species act to repair the breach by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier. The effectiveness of the oxidizing species is a

function of its individual oxidation-reduction potential, with more highly oxidized species exhibiting greater corrosion protection" (paragraph 51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al. by using the cobalt sulfate and sodium chloride of Beebe, Jr. et al., because cobalt sulfate and sodium chloride would yield an electroplated cobalt-phosphorous coating having high tensile strength and good corrosion resistance properties. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the solution of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraph 51). With respect to the concentration of cobalt sulfate, perborate, and phosphoric acid, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the concentrations to within the ranges of the instant claim by routine experimentation in order to form a cobalt-phosphorous alloys having the desired tensile strength and corrosion resistance properties. Furthermore, changes in concentration will not support the patentability of subject matter unless there is evidence indicating such concentration is critical. It is not inventive to discover the optimal or workable ranges by routine experimentation (MPEP 2144.05).

Regarding claims 31, Brenner et al. does not explicitly teach the solution having the specific surface tension of the instant claim. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have

recognized that the solution of Brenner et al. would have the specific surface tension of the instant claim, because the solution produces a cobalt-phosphorous coating having similar tensile strength and corrosion resistance properties.

Regarding claim 35, Brenner et al. teach using a current density of 5-30 A/dm<sup>2</sup>, equivalent to 50-300 A/ft<sup>2</sup> (column 5 lines 35-39).

Regarding claim 36, Brenner et al. teach an electroplating method comprising the steps of: submerging a substrate having a catalytically active surface into a cobalt-phosphorous plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35); cobalt metal ions (figure 9) contained within said plating solution, chloride ions (figure 9) contained within said plating solution, phosphorous ions (figure 9) contained within said plating solution as phosphorous acid having a concentration of 0-160 g/L or about 0-21.3 oz/gal (figure 2 and 4) which is within the range of the instant claim, an oxidizing agent (or boric acid, column 3 lines 21-25) contained within said plating solution, and a hardening agent (or phosphorous acid, figure 9) contained within said plating solution. The coating of Brenner et al. is inherently a wear resistant coating, since it has a high Vickers hardness (column 5 line 73 -- column 6 line 70).

It is well known in the art that any electroplating process inherently comprises the step of immersing a substrate in an electroplating bath containing an anode and a cathode (as the substrate), since metal is being plated in a solution. Electroplating by definition comprises the step of passing an electric current between the anode in the cathode, since positive metal ions are attracted to the cathode where they combine with electrons, yielding neutral metal which is plated onto the electrode. Furthermore,

Brenner et al. teach electroplating a cobalt -phosphorous coating in a solution containing the same constituents as those of the instant claim (i.e., cobalt ions, phosphorous ions and boron) and with the same composition in the coating (i.e., a cobalt-phosphorous coating having up to 10% phosphorus (column 4 lines 31-38)).

Although Brenner et al. does not explicitly teach the concentration a boron, a cobalt -phosphorous coating plated by a solution comprising of boric acid as a source of boron would inherently comprise boron in the coating, since the method of forming the coating as taught by Brenner et al. is the same as that of the instant claim.

Brenner et al. also differ from the instant claims in that the reference does not explicitly teach a solution comprising of cobalt sulfate and sodium chloride or their concentration; perborate as the source of boron or its concentration; or the specific thickness of the instant claim.

Beebe, Jr. et al. and Sturgill et al. teach the features described above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al. by using the cobalt sulfate and sodium chloride of Beebe, Jr. et al., because cobalt sulfate and sodium chloride would yield an electroplated cobalt-phosphorous coating having high tensile strength and good corrosion resistance properties. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the solution of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraph 51).

With respect to the thickness of the coating, Brenner et al. teach that a thick coating provides better corrosion protection than a thin coating (column 8 lines 50-54). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Brenner et al. by electroplating a cobalt-phosphorous coating to the thickness of the instant claim in order to provide greater corrosion protection as suggested by Brenner et al.. It would have been obvious to one having ordinary skill in the art to expect that a thick coating would be more wear resistant than a thin coating, because a thicker coating would be harder and more durable.

Regarding claims 37-38, Brenner et al. differs from the instant claims in that the reference does not explicitly teach pretreating the surface.

Sturgill et al. teach a process for plating, comprising the steps of: providing a substrate having a surface, cleaning and preparing (paragraph 753-770) said surface during a pretreatment during a cobalt-phosphorous plating process, applying a cobalt-phosphorous-boron coating (paragraph 771) to said surface and finishing said surface during a post treatment process (paragraph 773-781).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Brenner et al. by pretreating the surface as taught by Sturgill et al., because it would remove oil or greases on the part to be coated, thus improving the adhesion of the coating (paragraph 764).

Regarding claim 40, since a mask is used for protecting areas where the coating is not desired during the electroplating process, removing a mask would have been obvious to one having ordinary skill in the art when its function is no longer desired.

Regarding claim 41, Brenner et al. teach a method, comprising the steps of: submerging a substrate having a catalytically active surface into a cobalt-phosphorous plating solution having a pH value in the range of 0.5-2.0 (column 2 lines 30-35); providing a plating solution comprising cobalt chloride (figure 9) contained within said plating solution, boric acid (column 3 lines 21-25) contained within said plating solution, phosphoric acid, and phosphorous acid having a concentration of up to 160 g/L or about 21.3 oz/gal (figure 4) which is within the range of the instant claim. Brenner et al. teach baking a cobalt -phosphorous coating to increase its hardness (Column 5 line 73 -- column 6 line 4). Brenner et al. teach using a current density of 5-30 A/dm<sup>2</sup>, equivalent to 50-300 A/ft<sup>2</sup> (column 5 lines 35-39). The coating of Brenner et al. is inherently a wear resistant coating, since it has a high Vickers hardness (column 5 line 73 -- column 6 line 70).

It is well known in the art that any electroplating process inherently comprises the step of immersing a substrate in an electroplating bath containing an anode and a cathode (as the substrate), since metal is being plated in a solution. Electroplating by definition comprises the step of passing an electric current between the anode in the cathode, since positive metal ions are attracted to the cathode where they combine with electrons, yielding neutral metal which is plated onto the electrode. Furthermore, Brenner et al. teach electroplating a cobalt -phosphorous coating in a solution

containing the same constituents as those of the instant claim (i.e., cobalt ions, phosphorous ions and boron) and with the same composition in the coating (i.e., a cobalt-phosphorous coating having up to 10% phosphorus (column 4 lines 31-38)).

With respect to the thickness of the coating, Brenner et al. teach that a thick coating provides better corrosion protection than a thin coating (column 8 lines 50-54). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Brenner et al. by electroplating a cobalt-phosphorous coating to the thickness of the instant claim in order to provide greater corrosion protection as suggested by Brenner et al.

Although Brenner et al. does not explicitly teach the concentration a boron, a cobalt -phosphorous coating plated by a solution comprising of boric acid as a source of boron would inherently comprise boron in the coating, since the method of forming the coating as taught by Brenner et al. is the same as that of the instant claim.

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach providing and pretreating an aircraft component; providing cobalt sulfate and sodium chloride or their concentration; perborate as the source of boron or its concentration; or removing the mask.

Sturgill et al. teach a process for plating, comprising the steps of: providing a aircraft component substrate having a surface (paragraph 4), cleaning and preparing (paragraph 753-770) said surface during a pretreatment during a cobalt-phosphorous plating process, wherein said pretreatment comprises degreasing, masking, alkaline cleaning, acid activity (such as deoxidizing) (paragraph 753-770), applying a cobalt-

phosphorous-boron coating (paragraph 771) to said surface and finishing said surface during a post treatment process (paragraph 773-781). Sturgill et al. teach using perborate as suitable oxidizers, which function to repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier (paragraphs 51-53). In addition, Sturgill et al. teach that "oxidation of the cobalt to the trivalent state may also be achieved in the conversion coating solution through electrolytic means" (paragraph 54). Providing an anode and applying a current are inherent steps in an electroplating process. Although Sturgill et al. does not explicitly teach the step of removing the mask after a coating has been deposited, removing a mask would have been obvious to one having ordinary skill in the art when its function is no longer desirable, since a mask is used for protecting areas where the coating is not desired during the electroplating process.

Beebe, Jr. et al. teach method of plating a cobalt-phosphorous layer with the characteristics of "long fatigue life and high load carrying capacity in addition to ... good corrosion resistance" (column 1 lines 23-28) for the fabrication of bearings and the like. In addition, Beebe, Jr. et al. teach that a typical cobalt-phosphorus plating solution comprises copper sulfate, sodium chloride (with a concentration of 17 g/L or about 2.3 oz/gal, which is within the range of the instant claim) and boric acids; and that a similar plating of cobalt- phosphorous can be suitably achieved by employing a solution comprising of cobalt chloride and sodium hypophosphite (column 4 lines 16-45).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Brenner et al. by pretreating the

surface of the substrate, because it would improve the adhesion and uniformity of a plated metal coating on the substrate.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Brenner et al. by using the perborate of Sturgill et al., because it would repair a scratch on a coating by oxidizing the metal in the presence of water, and quickly reforming an oxide barrier. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Brenner et al. by electroplating the aircraft component of Sturgill et al., because aircraft components are susceptible to corrosion, and thus would require a corrosion resistant coating.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the method of Brenner et al. by substituting cobalt chloride with cobalt sulfate and sodium chloride as taught by Beebe, Jr. et al., because cobalt sulfate and sodium chloride yields an electroplated cobalt-phosphorous alloy having high tensile strength and good corrosion resistance properties.

With respect to the concentrations of the chemical compounds, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the concentrations to within the ranges of the instant claim by routine experimentation in order to form a cobalt-phosphorous alloys having the desired tensile strength and corrosion resistance properties. Furthermore, changes in concentration will not support the patentability of subject matter unless there is evidence indicating

such concentration is critical. It is not inventive to discover the optimal or workable ranges by routine experimentation (MPEP 2144.05).

Regarding claim 42, a plating tank is inherently provided for holding the plating solution.

Regarding claim 44, although Brenner et al. does not explicitly teach the plating rate, Brenner et al. teach that increasing the bath temperature increases the cathode efficiency (figure 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the rate of deposition by changing the parameters of the plating solution, such as temperature, current density and concentrations, through routine experimentation in order to form a cobalt-phosphorous alloys having the desired tensile strength and corrosion resistance properties.

Claims 17-18 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Sturgill et al., Beebe, Jr. et al., and further in view of Kedward et al.

Brenner et al., Sturgill et al. and Beebe, Jr. et al. teach the solution as described above in addressing claim(s) 13.

The difference between the reference to Brenner et al. and the instant claims is that the reference does not explicitly teach using cobalt chips or cobalt balls as a source for the cobalt metal ions.

Kedward et al. teach using cobalt chips as a source for the cobalt metal ions in a cobalt plating solution (column 4 lines 22-33).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution of Brenner et al., Sturgill et al. and Beebe, Jr. et al. by using cobalt chips or cobalt balls as a source for the cobalt metal ions as taught by Kedward et al., because cobalt chips or cobalt balls can be easily dissolved in a plating solution. Furthermore, since the instant claims are directed to a solution, the size and shape of the anode would not patentably distinguish the instant invention.

Claims 32 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al. in view of Beebe, Jr. et al. and Sturgill et al., and further in view of Du Rose.

Brenner et al., Beebe, Jr. et al., and Sturgill et al. teach the solution as described above in addressing claim(s) 28. The difference between the references and the instant claims is that the references do not explicitly teach the solution having the specific temperature of the instant claim, although Brenner et al. teach that increasing the bath temperature increases the cathode efficiency (figure 3) and "most of the plating was done that 75°C" (column 5 line 4).

Du Rose teach that the operating temperature of a typical bath, comprising of cobalt chloride or cobalt sulfate (column 6 lines 53-58), is in the range of about 130-150°F (column 8 lines 4-13). Du Rose further noted that this range of temperatures not critical, and that good deposits may be obtained at temperatures as low as 50°F or lower to as high as 180°F.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the combined solution of Brenner et al., Beebe, Jr. et al., and Sturgill et al. by operating within the temperature range of Du Rose, because such temperature range is suitable for depositing a corrosion resistant coating.

### ***Response to Arguments***

Applicant's arguments filed April 25, 2006 have been fully considered but they are not persuasive.

In the arguments presented on page 12 of the amendment, the applicant argues that boron from the boric acid of Brenner et al. would not be co-deposited. However, the arguments of counsel cannot take the place of evidence in the record. *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). Objective evidence which must be factually supported by an appropriate affidavit or declaration to be of probative value includes evidence of unexpected results, commercial success, solution of a long-felt need, inoperability of the prior art, invention before the date of the reference, and allegations that the author(s) of the prior art derived the disclosed subject matter from the applicant. See, for example, *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984). See MPEP 716.01(c).

With respect to the argument on page 13 that Brenner et al. teach the pH of "high phosphite bath... must be kept between 0.5 to 1.0" and thus would not be obvious to use a pH outside of this range. The examiner respectfully disagrees. Brenner et al.

teach that this pH range is critical only for the high phosphite baths, and therefore suggest that a pH above this range can be used for low phosphite baths. Nevertheless, Brenner et al. expressly teach "the best deposits were obtained from ordinary nickel or cobalt baths to which phosphoric, and phosphorus acids had been added. The favorable pH of the baths was between 0.5 and 2.0 depending upon their compositions" (column 2 lines 29-34). Moreover, as the applicant is aware, a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied*, 493 U.S. 975 (1989). See also *Celeritas Technologies Ltd. v. Rockwell International Corp.*, 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir. 1998). Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). See MPEP 2123.

In response to applicant's arguments against the Sturgill et al., Beebe, Jr. et al., Kedward et al., and Du Rose, references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The applicant argues against the secondary references by pointing out the deficiencies in the secondary references that are already taught by the primary reference. Brenner et al., for example, already teach the pH range of the instant claim. Even though Beebe, Jr. et al. teach a different pH range, it would have been obvious to one having ordinary skill in the art to use the pH of

Brenner et al. when combining the cobalt sulfate and sodium chloride of Beebe, Jr. et al., because using the pH of Brenner et al. yields a uniform and corrosion resistant coating. Secondary references that are identical to the primary reference would obviate any 103(a) combinations. The examiner agrees that the secondary references do not anticipate the instant claims, therefore rejections under 35 U.S.C. 103(a) are appropriate.

Regarding Sturgill et al., the applicant argues on page 17 that it would not have been obvious to combine the teachings of Sturgill et al. with the teachings of Brenner et al. to achieve the the plating solution and the plating process of the present invention, since Sturgill et al. uses a different coating process. The examiner acknowledges that the methods may be different. However, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As the Court of Appeals for the Federal Circuit has stated, there are three possible sources for motivation to combine references in a manner that would render claims obvious. These are: (1) the nature of the problem to be solved; (2) the teaching of the prior art; and (3) the knowledge of persons of ordinary skill in the ad. *In re Rouffet*, 47 U.S.P.Q.Zd 1.453, 1458 (Fed. Cir. 1998). In the instant case, both Brenner et al. and Sturgill et al. are directed to plating a cobalt-phosphorous coating for corrosion protection. Furthermore,

Brenner et al. teach "The phosphorus-cobalt and -nickel deposits should be useful wherever hardness is required and might be considered as an alternative to chromium deposits" (column 8 lines 63-67); likewise, Sturgill et al. teach "Significant efforts have been made to replace chromium with other metals for corrosion-inhibiting applications due to toxicity, environmental, and regulatory concerns. Cobalt is one non-toxic, non-regulated metal which has been considered as a chromium replacement" (paragraph 15).

In response to the argument that the cobalt is not oxidized to a trivalent charge state in the instant invention, the applicant is arguing a limitation which is not in the claim. Neither the instant claims require nor the specification discuss that the cobalt is oxidized or not oxidized. During patent examination, the pending claims must be given their broadest reasonable interpretation consistent with the specification. *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). See MPEP 2111.

In response to the argument that the coating of Sturgill et al. is used for a different purpose, such as corrosion protection, than that of the instant invention, "the reason or motivation to modify the reference may often suggest what the inventor has done, but for different purpose for to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result

discovered by applicant" (MPEP 2144) and "there is no requirement that the prior art provide the same reason as the applicant to make the claimed invention" (MPEP 2144).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan V. Van whose telephone number is 571-272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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